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Sand Mt. in Jackson, Co., in company with Mr. A. H. Howell. It grew in low sandy woods near Miller Creek.

I have sent duplicates of almost all the ferns I have collected in Alabama, to the Herbarium of the American Fern Society. Any member wishing to examine them will find them there.

BENTONSPORT, IOWA.

The Story of a Fern Garden—II.

EDWARD HALE CLARKSON

The three species, well named by Clute "the marsh fern tribe," all grow well. I placed the simulata close to and on the west side of my high board fence where it gets plenty of overhead light, but very little sunshine, and it thrives, puts out fine fertile fronds, and is increasing. The Marsh fern, like *Onoclea sensibilis*, has to be violently restrained to keep it within bounds. The New York fern is one of the most satisfactory in the garden, and shows best in rather small clumps.

The Polypody is another fern that is both easy to manage in the garden and easy to transplant. Sheets of this fern may be lifted from boulders in the woods and brought to the garden in perfect condition. Placed on rock work, in a not too shady spot, the fern grows as well as before being moved.

In the case of the Brake (*Pteris aquilina*) I planted a small root four years ago—fortunately more than one hundred feet away from my fern garden—and close to the fence. It has thrived amazingly and threatens to cover both my yard and the garden next door. I would not be at all surprised if my neighbor should sue me for damages if he by any chance reads this incriminating article.

The Lady fern, most amazing in its varieties, is another obstreperous plant. To say that this fern thrives is a decidedly mild statement. I may truthfully state regarding this species that it has shown the characteristics exhibited by a young cow-bird in a summer yellow-bird's nest—a tendency to absorb the giant's share of the nourishment and to elbow the other fellow out of house and home. It spreads rapidly.

The Brake, Lady fern, Sensitive fern, and also the Marsh fern and Dicksonia should all be planted away from the others.

The Silvery Spleenwort is quite a thrifty fern, although it does not grow as large and fine here as in its favorite haunts in the woods. However, it does very well, putting out fertile fronds that sometimes measure nearly three feet in length. It suffers rather severely some seasons by being badly eaten by shell-less snails. The Maidenhair Spleenwort has grown beautifully in a rockery specially constructed for it. It appears to do best in moist pockets under shelving rocks, where the sun never shines. It insists on good drainage.

I have no luck with *Asplenium angustifolium*. It lives, it is true, but its fronds are spoiled each year by a brown blight which absolutely destroys their beauty.

The Maidenhair is not only a wonderfully handsome, graceful fern, but it takes readily to the garden and increases each year if given a congenial soil. Its habit of putting up new fronds all during the season is particularly pleasing. The only drawback is that unless one is looking after it very carefully all the time it is apt to get eaten to a mere skeleton by slugs before one realizes that these miserable creatures are about.

Three colonies of the *Lygodium palmatum* are on their third year with me, and, up to this time, have done very nicely. They were all quite young plants when I received them, so that they are as yet rather immature.

The Hart's Tongue is a most charming fern, but, unfortunately, is not absolutely hardy in this climate. The very severe winter of 1917-18 killed a colony of large fine plants that had grown well in my garden for several years. A curious thing about this plant is that it does not seem to really start growing in good shape until just before the coming of the frosts in the autumn, at which time it is unrolling goodly numbers of thrifty fronds. Since losing my fine Hart's Tongues I bring all my plants into the house in the late fall, keeping them all winter in a cold room, where they are not subject to the extreme low temperatures. This seems to be just what they want, for they get an early start—by March—and put out beautiful big fertile fronds over twenty inches in length. So when I put them back into the garden in the spring they are much finer than any that I ever had before, and I do not have to wait all summer to see them at their best.

Although both *Woodsia obtusa* and *Woodsia ilvensis* are growing in my garden and apparently doing well, I have not had them long enough to be sure that they are absolutely established.

The three Beech ferns are easily grown and to my mind are, as a family, the most satisfactory garden ferns of the smaller sorts. They are most effective when grouped in fairly good-sized colonies, each one by itself. The Oak fern produces larger and finer fronds in my garden than any I ever saw in the wild, and the Long Beech fern does wonderfully well.

A small fern that does very nicely for me is the narrow-leaf Chain fern. Given frequent showerings with the hose, it reciprocates with fine fertile fronds, if not in too shady a spot.

The Fragile Bladder fern is one of our hardiest species and is sure to do well in the garden. It is particularly effective in the rockery. The Bulblet Bladder fern is

also very hardy and very easily grown. It is also a remarkably handsome fern and should be in every collection.

To sum up, there are over forty species of New England ferns and several *Dryopteris* hybrids growing in my garden, most of them doing quite well.

EXPERIMENTING.—The enthusiastic amateur in starting a fern garden is at first strongly tempted to experiment with a number of the rarer rock ferns, such as *Asplenium viride*, *Pellaea atropurpurea*, *Asplenium pinnatifidum*, etc., ferns that are extremely difficult to grow. The results are practically sure to be very disappointing, although there is some pleasure in having them growing in one's garden even for a short time.

In my opinion, however, it is much more satisfactory to confine one's attention to the ferns that are sure to do well in the particular section where the fern garden is located.

TRANSPLANTING THE FERNS.—Success in transplanting ferns from the woods to the fern garden depends on several important points. First and most important, the roots must be disturbed as little as possible. In digging most of the big ferns, such as the *Osmundas*, I used a grub hoe with a sharp edge, and also a long-handled spade. I dug deeply and sufficiently far away from the plant to take up plenty of soil and to disturb the roots little, if any. Aside from not disturbing the roots, this has the added advantage of bringing to the garden with the fern, plenty of the material in which it was growing and thus reproducing, to a large degree, the conditions of its native wood. The early spring is the best time to transplant, and the plants should, if possible, be taken just as the crosiers are unrolling. The ground at that time is cold and full of moisture, and ferns transplanted then hardly seem to feel the change at all.

I was quite amused to have the livery stable man remark more than once: "It does beat all, Mr. Clarkson, what bad luck you do have with the rain lately, when you hire this team." Now, the truth was that I several times selected a day of gentle rain for a collecting trip, because ferns transplanted then nearly always kept on growing without the least setback, apparently never sensing that they had been moved.

In bringing ferns to the garden, one is very apt, at first, to place them too near together, so that, as the crosiers unroll, they do not have a chance to expand without crowding each other. It really is astonishing the way the average fern will reach out as it unrolls.

A few of the finest selected ferns, with plenty of room to spread out and show to advantage, are infinitely better than inferior and crowded plants.

Although I planned originally to have only native shrubs, I found it expedient to modify this plan somewhat. For instance, the common white lilac, which does not sprout very freely from the roots, proved to be very valuable as used in clumps for shade, because it could be moved about during May and early June without wilting badly, and I sometimes found it desirable to change the amount of shade for special fern groups as the season advanced. The common purple lilac should not be used for this purpose as it sprouts freely from the roots and will spread all over the garden.

Most ferns need more sunlight than I, at least, had any idea of, but in most cases they want this sunshine for only a limited portion of the day.

Transplanting ferns during the hot days of summer is as a rule not particularly successful. If possible, ferns found at this time should be marked and moved later in the year, after the weather becomes cooler.

CARE OF THE GARDEN.—From the deciduous trees growing in the garden it receives a generous shower of

leaves in the autumn. I let many of these leaves stay on the ground, sprinkling them with sand or leaf mould to hasten their decay. This makes a good mulch to hold the moisture and also is a source of plant food, just as nature intended. It is a mistake to clear away too many leaves and old fern fronds just to "tidy up." Most ferns need plenty of moisture while maturing their fronds and an occasional thorough drenching with the fine spray from the garden hose, if the clouds do not furnish sufficient water, will do much good. If the ground is dry in the late autumn the hose should also be used, as ferns, like many other plants, will go through the winter better if the ground is full of moisture when it freezes.

SECOND GROWTH FRONDS.—Frequent rains during the summer will sometimes bring out a second growth of fronds on some, but not all, of the ferns. Because of such rains during July and August in 1918 my *Dryopteris Filix-mas*, *cristata*, *Goldiana*, *marginalis*, *spinulosa*, *intermedia*, "*Boottii*," *Cystopteris fragilis* and *D. cristata* \times *marginalis* put out a new crop of fronds. It was noticeable at this time (about September 1st) that although the Broad Beech fronds were still unrolling, many of them being of a beautiful light-green color, no new fronds appeared on the Long Beech fern, which had long before this stopped growing for the season. All its fronds had lost their fresh green color and turned to a dull homely olive.

START A FERN GARDEN!—In closing this article I would urge the reader to start a fern garden, even if on a very modest scale. As an investment I can, from my own experience, guarantee that it will pay big dividends in the added health, pleasure, and intimate knowledge of the living ferns that it will surely bring to you.

NEWBURYPORT, MASS.